ABSTRACT OF THE DISCLOSURE

A probabilistic input-output system is used to classify media in printer applications. The probabilistic input-output system uses at least two input parameters to generate an output that has a joint dependency on the input parameters. The input parameters are associated with image-related measurements acquired from imaging textural features that are characteristic of the different classes (types and/or groups) of possible media. The output is a best match in a correlation between stored reference information and information that is specific to an unknown medium of interest. Cluster-weighted modeling techniques are used for generating highly accurate classification results. Within the imaging process, grazing angle illumination (i.e., introducing light at an angle of at least 45 degrees to the normal of the surface being imaged) provides sufficient contrasts for distinguishing the structural features (e.g., paper fibers) of the unknown medium, but non-grazing illumination may be used when specular measurements are to be obtained.